JOURNAL OF THE FRANKLIN INSTITUTE.

Vol. CXVIII.

INDEX.

Acoustic Experiment 392
Actinometer, Hirn's 238
Adger, J. B. (and J. E. Sague) Trial of the "City of Fall River" 62, 102, 197
Aluminium and its Bronzes 239
Artificial Graphite 313
Atlee, Louis W., Our Clothing and Our Homes 263
Atmospheric Changes at Nice 115
Atomic Motion 392
Auroras, Periodicity of 158

Backwater. By C. H. Peabody 350
Balloon Passage (the first) between France and England 311
Balloon Photography 240
Barometer, A Natural 393
Bidwell, Shelford, An Explanation of Hall's Phenomenon 184
Bilgram, Hugo, Tests by Hydrostatic Pressure 307
Bismuth, Variations of, in a Magnetic Field 391
Boiler Explosions, Protection Against 309
Bolt-Heads and Nuts (Hexagon), Standard Sizes For. By C. E. Simonds and Coleman Sellers 473

Book Notices:

Topographical Surveying (Specht); New Methods in Topographical Surveying (Hardy); Geometry of Position Applied to Surveying (McMaster); Co-ordinate Surveying (Walling) 76
Recent Locomotives (R. R. Gazette) 78
The Watch- and Clock-Maker's Hand-book, etc. (Britten) 78
Bulletin de la Société Internationale des Électriciens 79
The Principles and Practice of Electric Lighting (Swinton) 79
On an Unsymmetrical Law of Error in the Position of a Point in Space (Foster) 155

Book Notices:—Continued.
A New System of Laying Out Railway Turnouts, etc. (Clark)..... 155
Tables for Calculating Cubic Contents of Excavations, Embankments, etc. (Hudson)..... 156
A Treatise on Toothed Gearing (Cromwell)..... 308
Philadelphia Insurance Chart for 1884–1885 (Whitney)..... 477
The Car Builders' Directory (Forney, Garey and Smith)..... 477
Books added to the Library, from January to June, 1884.....315, 396

Caoutchouc, New Source of..... 313
Caseine for Sizing..... 159
"City of Fall River," Report on the Trial of the. By Sague and Adger, 62, 102, 197
Chase, Pliny E., Ellipticity of Planets..... 28
" " The Earth's Ellipticity..... 295
" " Harmonic Motions in Stellar Systems..... 342
Chestnut Timber..... 158
Clothing (Our) and Our Homes. By Louis W. Atlee..... 263
Coins, Microscopic Organizations on the Surface of 126
Colné, Charles, The Panama Interoceanic Canal..... 353
Comparison (hygienic) between Gas and Electric Light..... 393
Compound Engines, Early..... 478

Correspondence:
Thurston (R. H.), The Cheapest Point of Cut-off..... 75
D'Auria, L., Ellipticity of Planets..... 152
Webber, Samuel, Tests of a Geyelin Jonval Turbine Water Wheel..... 152
Bilgram, Hugo, Tests by Hydrostatic Pressure..... 307
Storer, F. H., An Item of History as to the Idea of making the Parts of Guns Interchangeable..... 385
B. H. B. Early Compound Engines..... 478
Cosmogony, Faye's..... 394
Cromwell, J. Howard, Answer to Reviewer..... 385

D'Auria, L., How to Determine the Grade of Expansion and the Size of a Steam Engine which is to perform a given duty with the least total Expenditure of Money per working hour..... 1
" " The Earth's Ellipticity.....127, 152, 471
Diamond, Phosphorescence of the..... 313
Discharge of Turbine Water Wheels. By J. P. Frizell..... 29
Dudley, Wm. L., The Iridium Industry..... 35
Dynamo-Electric Machinery, A Lecture by George Forbes..... 401

Elasticity (perfect) of Chemical Solids..... 309
Electric Boats..... 309
Electric Jewels..... 166
Electric Light and Gas, Hygienic Comparison Between..... 393

Electric Light in Theatres 391
Electric Lighting, Private 394
Electric Phenomena, Hydro-dynamic Imitation of 312
Electrical Currents, Optical Measurements of 392
Electrical Exhibition, The International, of the Franklin Institute 305
Electricity and Vapor 395
Electricity, Hatching Chickens by 311
Electricity in Agriculture 394
Electricity in Coining 391
Electricity, On the Application of, as an Illuminating Agent in Astronomical Observations. By W. S. Franks 172
Electricity, Tanning by 239
Electro-Dynamics. By John W. Nystrom 24
Electro-Magnet, New 239
Electrolysis, New Applications of 310
Ellipticity of Planets. By Pliny Earle Chase. (See Earth's Ellipticity) 28
" " By L. D'Auria 152
Ellipticity, The Earth's. By L. D'Auria and Pliny E. Chase 127, 295, 471
Expansion, To determine the Grade, of, etc., in a Steam Engine, to perform a given duty most economically. By L. D'Auria 1
Exhibition, International Electrical, of the Franklin Institute 160, 305, 377 449

Faye's Cosmogony 394
Forbes, George, Dynamo-Electric Machinery 401
Franklin Institute—Books added to Library 315, 396
" " Proceedings of the Stated Meetings, June, September, October, November 80, 314, 389, 478
" " International Electrical Exhibition 160, 305, 377, 449
" " Report of Committee to prepare a Memorial of Robert E. Rogers 387
Franks, W. S., On the Application of Electricity as an Illuminant in Astronomical Observations 172
Frizell, J. P., The Discharge of Turbine Water-wheels 29

Gases in Steel 239
Geissler Tubes, Intensity of Current in 395
Glass, Suggestions for Improvement in the Manufacture of. By George W. Holley 132
Glimpses of the International Electrical Exhibition 377, 449
Glue, Tests of 394
Grapes (American), Importation of, into France 312
Graphite, Artificial 313
Grimshaw, Robert, Length of Indicator Cards 296
Gunpowder Magazines, The Drying of. By Chas. E. Munroe 180

Hall's Phenomenon, An Explanation of. By Shelford Bidwell 184
Harmonic Motion in Stellar Systems. By Pliny E. Chase 342

Hart, J. S. (and Hunking, A. W.), Velocity of Approach in Weir Computations 121
Hatching Chickens by Electricity 311
Heat of Combustion of Coal. By Chief Engineer Isherwood, U. S. N. 5
Heat Regulator, a Metastatic. By N. A. Randolph 178
Hering, Rudolph, Surveys for the Future Water Supply of Philadelphia 138, 224, 279
High Pressures, Influence of, on Living Organisms 101
Hirn's Actinometer 238
Holly, George W., Suggestions for Improvement in the Manufacture of Glass 132
Houston, Edwin J., Synchronous-Multiplex Telegraphy in Actual Practice 161
" " An Extraordinary Experiment in Synchronous-Multiplex Telegraphy 167
" " Glimpses of the International Electrical Exhibition 377, 449
Hunking (A. W.), and Hart (F. S.), Velocity of Approach in Weir Computations 121
Hydro-dynamic Imitation of Electric Phenomena 312
Hydrogen, Relations of 159
Hydrostatic Pressure, Tests by. By S. Lloyd Wiegand 116

Incandescent Lamps, Luminous Power of 393
Indicator Cards, Length of. By Robert Gimshaw 296
Intensity of Current in Geissler Tubes 395
Iridium Industry, The. By Wm. L. Dudley 35
Isherwood, Chief Engineer, U. S. N. Heat of Combustion of Coal 5

Krakatoa, Ashes of 240

Le Van, W. Barnet, New York to Chicago in Seventeen Hours 16
Luminous Power of Incandescent Lamps 393

Magnesium, Pure 313
Magnetism in Madagascar 131
Manganese in Wine 310
Mechanical Engineering, Instruction in. By Robert H. Thurston 188
Microscopic Organisms on the Surface of Coins 126
Moss Board 159
Munroe, Chas. E., On the Drying of Gunpowder Magazines 180

Neptune, Variable Brilliancy of 393
Nystrom, John W., Electro-Dynamics 24
" " Tests by Hydrostatic Pressure 386

Obituary. Robert E. Rogers 387
Observatory, Papal 240
Oxygen, Use of, as a Refrigerant 158

Palmieri's Atmospheric Electricity 239
Panama Interoceanic Canal, The. By Chas. Colné 353
Paving (Street), Report of the Board of Experts on 210
Peabody, C. H. Backwater 350
Phosphorescence of the Diamond 313
Phosphorized Brass 159
Photography, Balloon 240
Physical Astronomy, Methods in 237
Planet, Trans-Neptunian 310
Predictions from Scintillation 393
Prout's Law 310

Quetil, Chas. J., Wire Triangular Truss 81

Randolph, N. A., A Metastatic Heat Regulator 178
Rogers, Robert Emple, Obituary Notice of 387
Ronaldson, C. E., Siemens' Regenerative Gas-Burners 298

Safety Lamp, Marsaut's 61
Sague, J. E. and J. B. Adger. Report on the Trial of the "City of Fall River" 62, 102, 197
Salom, Pedro G., Physical and Chemical Tests of Steel for Boiler and Ship-plate for the United States Government Cruisers 45
Sand, Bricks and Stones 395
Scintillation of the Stars 223
Scintillation, Predictions from 393
Sellers, Coleman, Standard Sizes for Bolt-Heads and Nuts 473
Sewers, Ventilation of 34
Ship Plates, for the U. S. Government Cruisers, Physical and Chemical Tests of. By Pedro G. Salom 45
Siemens', Regenerative Gas Burners. By C. E. Ronaldson 298
Simonds, C. E., Standard Sizes for Bolt-Heads and Nuts 473
Soap Roots 238
Solar Energy, Selective Absorption of 157
Solar Motor 238
Spectra, Variability of 392
Spectral Rays, Influence of temperature on 392
Standard Sizes for Hexagon Bolt-Heads and Nuts 473
Steam Boiler (the) as a Magazine of Explosive Energy. By Robert H. Thurston. 427
Steam Engine, How to Determine the Grade of Expansion and the Size of, to perform a given duty with the least total expenditure, etc. By L. D'Auria 1
Steam Engine, on the Development of the Theory of, etc. By R. H. Thurston 241
Steel, Gases in 239
Steel, Physical and Chemical Tests of, for Boiler and Ship Plates for the U. S. Government Cruisers. By Pedro G. Salom 45
Steel, to tell Iron from. W. F. Worthington 61

Storer, F. H. Making the Parts of Guns Interchangeable..... 385
Synchronous-Multiplex Telegraphy in Actual Practice. By Edwin J. Houston..... 161
Synchronous-Multiplex Telegraphy, an Extraordinary Experiment in. By Edwin J. Houston..... 167

Tanning by Electricity..... 239
Telegraphy, Concerning Synchronous-Multiplex. By Edwin J. Houston.....161, 167
Telescope, Bernauf's..... 126
Theory of the Steam Engine, etc. By Robert H. Thurston..... 241
Thomson, Sir Wm. The Wave Theory of Light..... 321
Thurston, R. H. Instruction in Mechanical Engineering..... 188
Thurston, R. H. "Trial of the City of Fall River"..... 62
Thurston, R. H. On the Development of the Theory of the Steam Engine and its application, an Historical Outline Sketch..... 241
Thurston, R. H. The Steam Boiler as a Magazine of Explosive Energy. 427
Tide-Gauges..... 311
Trans-Neptunian Planet..... 310
Trepanning Oysters..... 312
Trial of the "City of Fall River." By J. E. Sague and J. B. Adger..62, 102, 197
Truss, Wire Triangular. By Chas. J. Quetil..... 81
Turbine Water Wheels, the Discharge of. By J. P. Frizell..... 29

Uranus, Oblateness of..... 311

Velocity of Approach in Weir Computations. By A. W. Hunking and Frank S. Hart..... 121
Volcanic, Activity Origin of..... 240
Volcanic Ashes of Krakatoa..... 240

Water Supply of Philadelphia, Surveys for the Future. By Rudolph Hering 138, 224, 279
Wave Theory of Light, On the. By Sir William Thomson..... 321
Webber, Samuel. Tests of a Geyelin Jouval Turbine Water Wheel.... 152
Wiegand, S. Lloyd. Tests by Hydrostatic Pressure..... 116
Wire Gauge, New British Standard, The..... 95
Worthington, W. F. To Tell Iron from Steel..... 61